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Late Holocene climate swings: observations

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Stable isotope analysis from Greenland ice caps shows that the Holocene temperature in this area has slightly decreased since 8,200 BP. Apart from this weakly declining trend, temperature in this area was very stable and showed characteristic quasi-periodic fluctuations. In Central Europe a careful analysis of the largest alpine glaciers and of 20 lakes in the alpine forefield shows that the last 3,500 years can roughly be subdivided into three climate optima and pessima: Bronze Age Optimum, Iron Age Cooling, Iron/Roman Age Optimum, Migration Period Pessimum, Medieval Climate Optimum, Little Ice Age. This image of a general stability of the climate system during the Late Holocene is clearly disproved by records from many areas, mainly in the subtropics and tropics. These show a much higher precipitation variability causing major changes in past societies like, e.g. the collapse of the Mayan Civilization in Mexico. A clear relation of these swings to highly resolved time series of CO_2, CH_4 and N_2O in Greenland and Antarctica can not be established. The question is posed whether or not the influence of the sun (through its orbital and irradiance changes) was a decisive factor in modulating the observed decadal to centennial scale changes. How important was the contribution of volcanic eruptions (mainly if they occurred in groups) and what role played the natural variability of the climate system?